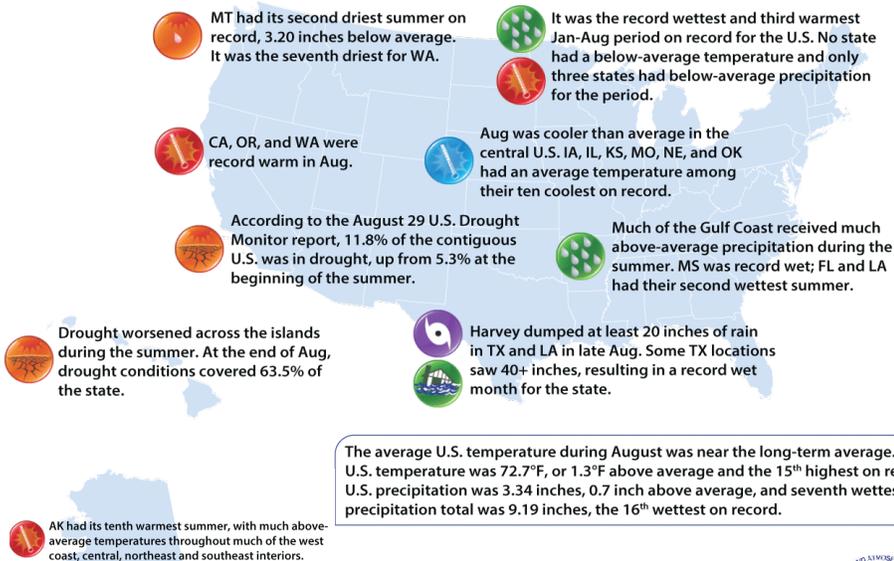


## Significant Events for June 2017 - August 2017

NCEI // www.ncdc.noaa.gov/sotc/national



The average U.S. temperature during August was near the long-term average. The summer U.S. temperature was 72.7°F, or 1.3°F above average and the 15<sup>th</sup> highest on record. August U.S. precipitation was 3.34 inches, 0.7 inch above average, and seventh wettest. The summer precipitation total was 9.19 inches, the 16<sup>th</sup> wettest on record.



### Jun-Aug Highlights for the West

Warmest summer on record for CA, NV; second warmest for OR, 3rd warmest for UT, and 4th for WA, AZ

CA, NV had warmest minimum summer temperatures on record; OR, ID, UT had 2nd warmest and AZ 3rd warmest.

Several locations set record for all-time warmest month in July: Reno, NV, Salt Lake City, UT, and Bakersfield, CA

Much drier than normal conditions across northern tier of West; MT had 2nd driest summer on record

Moderate to exceptional drought conditions developed across MT

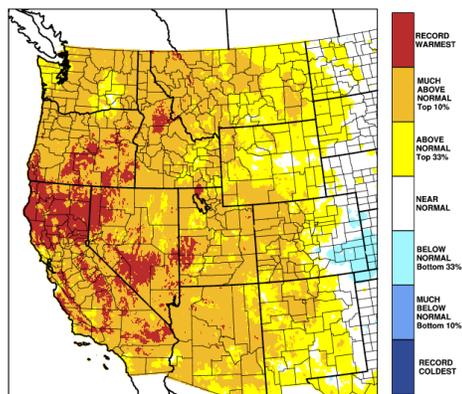
Fires throughout West destroyed many homes, produced poor air quality, and strained resources

La Niña conditions slightly favored to develop during the upcoming fall/winter

## Regional Overview for June 2017 - August 2017

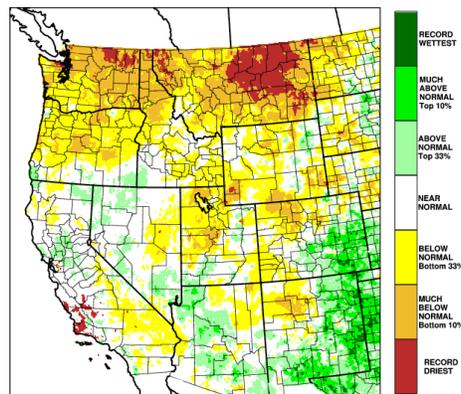
### Mean Temperature Percentile

June-August 2017



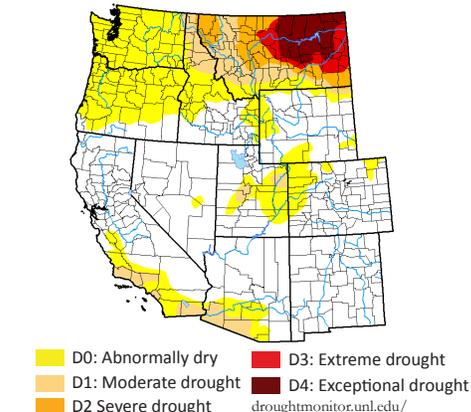
### Precipitation Percentile

June-August 2017



### U.S. Drought Monitor

August 29, 2017



Extreme heat waves affected different parts of the region throughout the season. A late June heat wave impacted the Southwest. Much of the Northwest experienced heat waves in both early July and early August. June temperatures were well above normal in the Southwest while July was well above normal nearly West-wide. In August, the greatest temperature anomalies were generally confined to the Pacific Northwest. OR and WA both had their warmest August on record, as did CA, driven by the northern part of the state. Summer temperatures were closer to, but still slightly above normal in areas east of the Rockies.

After a relatively late start, much of the core North American Monsoon region experienced above average July rainfall followed by a somewhat dry August. Tucson, AZ, observed its wettest July on record at 6.8 inches. Eastern NM also saw above normal rainfall, most of which fell in August. Some moisture made it northward into southern NV and the western Great Basin producing thunderstorms and above normal rainfall in those areas as well. Dry conditions dominated along the northern tier of the region throughout the season due to persistent high pressure and lack of moisture transport into the area.

The combination of above normal temperatures and below normal precipitation along the northern tier of the West prompted expansion of drought conditions. At the end of the summer season, 15% of the West and 90% of MT was experiencing moderate to severe drought. At the start of season, no portion of MT was in drought according to the USDM. Abnormally dry conditions were introduced across OR and WA this summer as well. Moderate drought remains entrenched in parts of southern CA and southwestern AZ. NM is free of all USDM designations for the first time since the USDM began in 1999.

# Regional Impacts for June 2017 - August 2017

## Weather

This summer, 12 deaths reported as heat-related in Phoenix Metro as well as 2 in CA and 2 in NM, others to be determined. Extreme temperatures in late June in Phoenix, AZ, temporarily grounded regional aircraft.

Late-season snowfall impacted CA and NV; Austin, NV, reported 12 inches snow in June, snowiest in 131-year record.

## Drought, Flooding and Water Resources

Melting of large snowpack produced high flows and dangerous conditions on many western rivers; several deaths. Eastern Sierra Nevada experienced damage to roads and bridges during record snowmelt runoff in June.

July 17 flash flood killed 7 people near Payson, AZ; flash flood on July 24 stranded 17 hikers east of Tucson, AZ.

August flash flooding in CA's Inland Empire resulted in road closures and rescues, evacuation of 200 people from train. Lake Powell inflow 114% of normal for runoff season.

## Agriculture and Fisheries

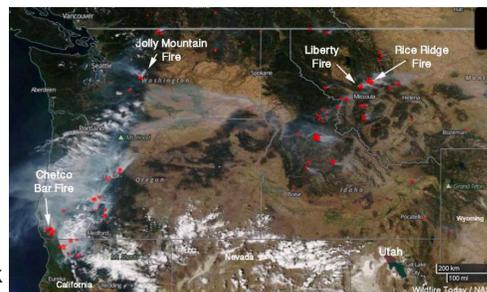
June heat wave killed hundreds of CA cattle, overwhelming processing facilities.

Substantial agricultural losses in MT due to drought; farmer and rancher livelihood greatly impacted.

Large bloom of pyrosomes, or "sea pickles", in northwest; cause of bloom is unknown and creatures cause damage to fishing nets.

Many fires impacted firefighters and the public in the West this summer. With fire agencies experiencing maximum resource demands by August, some fires saw minimal control progress as crews took mandatory rest breaks.

## Fires in the West

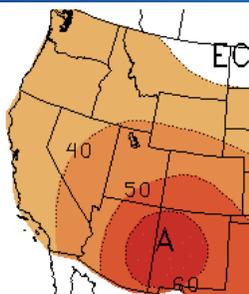


Fires and smoke in Pacific Northwest, Aug 27, 2017

International firefighting resources from Australia, Canada and New Zealand to support the US fire season were minimal due to the extensive fire season in Canada. The anomalously wet winter and spring in CA, the Great Basin, and Pacific Northwest generated fine fuels and brush that led to increased fire hazard. During this summer's heat waves, fuels experienced rapid and extreme drying, resulting in record low fuel moisture and hazardous fire conditions. In areas that experienced bark beetle attacks and tree die-offs during the multi-year drought in CA, fires have been more severe and difficult to fight, resulting in greater acreage burned. Smoke from wildfires dramatically reduced air quality in downwind areas. The Pacific Northwest experienced particularly bad air quality in August, reaching levels considered "very unhealthy" at times. In MT, rangeland fires have been devastating to ranchers by burning fencing and grazing areas and ultimately forcing many to sell off their livestock.

# Regional Outlook for Oct-Nov-Dec 2017

CPC // www.cpc.ncep.noaa.gov/



Oct-Nov-Dec temperature outlook produced by CPC Sep 21 2017

A indicates above normal  
B indicates below normal  
N indicates normal  
EC means equal chances for A, N or B

Numbers indicate percent chance of temperature in warmest/coolest one-third and of precipitation in wettest/driest one-third

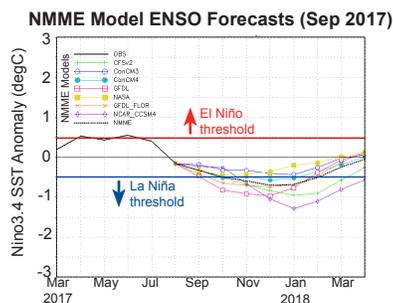


Oct-Nov-Dec precipitation outlook produced by CPC Sep 21 2017

## NOAA CPC Oct-Dec Seasonal Outlook

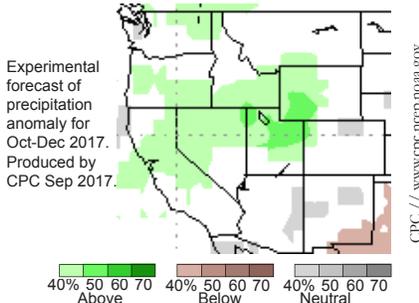
The fall temperature outlook gives at least a 33% chance of above normal temperatures West-wide, with higher chances, 50-60%, in the Four Corners states. The outlook slightly favors above normal precipitation in the Northwest, reflecting the possible development of La Niña conditions during the fall season.

CPC // cpc.ncep.noaa.gov/products/NMME/



## NMME ENSO Outlook

Four of 7 NMME models suggest weak to moderate La Niña conditions developing this fall, while the other 3 remain in the "neutral" range. The black line, indicating the mean among the models, favors weak La Niña conditions developing late in fall.



## NMME Precipitation Forecast

The National Multi-Model Ensemble combines 7 climate research models. The NMME suggests a 40% chance precipitation will be above normal this fall across northern CA and northern Great Basin and 50% chance for northeast UT.

## Western Region Partners

- Western Regional Climate Center**  
wrc.cdm.noaa.gov
- National Integrated Drought Information System (NIDIS)** - drought.gov
- Western Governors' Association**  
westgov.org
- Western States Water Council**  
westgov.org/wswc
- NOAA/ESRL Physical Sciences Division**  
esrl.noaa.gov/psd
- NOAA Climate Prediction Center**  
www.cpc.ncep.noaa.gov
- National Centers for Environ. Info. (NCEI)**  
www.ncdc.noaa.gov
- USDA/NRCS National Water and Climate Center** - www.wcc.nrcs.usda.gov
- National Interagency Fire Center**  
www.nifc.gov
- NOAA's Western Regional Collaboration Team**  
www.regions.noaa.gov/western/western\_region\_team.html
- Western Water Assessment**  
www.colorado.edu
- Climate Assessment for the Southwest**  
climas.arizona.edu
- California Nevada Applications Program**  
meteora.ucsd.edu/cnap
- Climate Impacts Research Consortium**  
pnwclimate.org/resources
- NWS River Forecast Centers**  
water.weather.gov/ahps/rfc/rfc.php
- NOAA Fisheries Service**  
www.nmfs.noaa.gov/
- NWS Western Region Forecast Offices**  
www.wrh.noaa.gov/
- State Climatologists** - stateclimate.org